

XUDONG ZHU

Postdoctoral Fellow

Colorado State University

& Lawrence Berkeley National Laboratory

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Education

Aug. 2010 - May 2014

PhD in Earth Science

Purdue University, West Lafayette, IN

Dissertation: Quantifying exchanges of methane and carbon dioxide between terrestrial ecosystems and the atmosphere in the northern high latitudes

MS in Ecology

Chinese Academy of Sciences, Beijing, China

Thesis: Modeling gross primary productivity in China's terrestrial ecosystems based on a light use efficiency model

BS in Geographical Science

East China Normal University, Shanghai, China

Undergraduate thesis: Estimating net ecosystem exchange of Qinghai-Tibet Plateau Grassland Belt Transect using machine learning techniques

Research Interests

Land-atmosphere interactions; Terrestrial water/carbon/nitrogen cycling; Greenhouse gas emissions; Climate change

Research Experiences

May 2014 - Present

Postdoc Fellow, joint position between Natural Resource Ecology Laboratory, Colorado State University (Dr. Matthew Wallenstein) and Earth Science Division, Lawrence Berkeley National Laboratory (Dr. William J. Riley and Dr. Jinyun Tang)

1) Develop, test, and apply microbe-explicit soil decomposition model in the Community Land Model (CLM) and Community Earth System Model (CESM)

2) Predict future high-latitude soil carbon-climate feedbacks

Aug. 2010 - May 2014	Research Assistant at Department of Earth, Atmospheric & Planetary Sciences, Purdue University, West Lafayette, IN (Dr. Qianlai Zhuang) 1) <i>Ecosystem modeling: examining water-carbon-nitrogen interactions in terrestrial ecosystems of northern high latitudes</i> 2) <i>Quantifying ecosystem carbon dynamics with machine learning techniques</i>
Aug. 2007 - Jul. 2010	Research Assistant at Institute of Geographic Science and Natural Resource Research, Chinese Academy of Sciences, Beijing, China (Dr. Honglin He) 1) <i>Established a geospatial database of photosynthetically active radiation in China</i> 2) <i>Studied light use efficiency and vegetation production in China</i>
Aug. 2006 - Jul. 2007	Research Assistant at Department of Geography, East China Normal University, Shanghai, China (Dr. Runhe Shi) 1) <i>Remote sensing and eddy covariance flux data processing</i> 2) <i>Estimated regional-level net ecosystem exchange using machine learning techniques</i>
Knowledge and Skills	<p>Knowledge in geography, ecology, environmental science, atmospheric science, hydrology, soil science, microbiology, statistics and computing science.</p> <p>Skills in numerical model development, mass data processing and supercomputing, remote sensing and GIS spatial analysis; experience with C/C++, MATLAB, Python, ArcGIS, EVNI/IDL and Unix shell scripting</p>

Publications

- Hao, G., Q. Zhuang, J. Pan, Z. Jin, **X. Zhu** and S. Liu (2014). [Soil thermal dynamics of terrestrial ecosystems of the conterminous United States from 1948 to 2008: an analysis with a process-based soil physical model and AmeriFlux data](#). *Climatic Change*, doi: 10.1007/s10584-014-1196-y.
- **Zhu, X.**, Q. Zhuang, X. Lu and L. Song (2014). [Spatial scale-dependent land-atmospheric methane exchanges in the northern high latitudes from 1993 to 2004](#). *Biogeosciences*, 11, 1693-1704, doi: 10.5194/bg-11-1693-2014.
- He, X., **X. Zhu**, H. Zhang and Q. Zhuang (2014). [Linear models of different scales](#). *International Journal of Research and Reviews in Applied Sciences*, 18(1).
- Tang, W., J. Qin, K. Yang, X. Niu, X. Zhang, Y. Yu and **X. Zhu** (2013). [Reconstruction of daily photosynthetically active radiation and its trends over China](#). *Journal of Geophysical Research: Atmospheres*, doi: 10.1002/2013JD020527.
- **Zhu, X.**, Q. Zhuang, X. Gao, A. Sokolov and C. Schlosser (2013). [Pan-Arctic land-atmospheric fluxes of methane and carbon dioxide in response to climate change over the 21st century](#). *Environmental Research Letters*, 8(4), doi: 10.1088/1748-9326/8/4/045003. ([Media coverage](#))

- Gao, Y., X. Liu, C. Min, H. He, G. Yu, M. Liu, **X. Zhu**, and Q. Wang (2013). Estimation of the North–South Transect of Eastern China forest biomass using remote sensing and forest inventory data. *International Journal of Remote Sensing*, 34(15), 5598-5610, doi: 10.1080/01431161.2013.794985.
- Qin, Z., Q. Zhuang, and **X. Zhu** (2013). Carbon and nitrogen dynamics in bioenergy ecosystems: 2. Potential greenhouse gas emissions and global warming intensity in the conterminous United States. *Global Change Biology Bioenergy*, doi: 10.1111/gcbb.12106.
- Qin, Z., Q. Zhuang, and **X. Zhu** (2013). Carbon and nitrogen dynamics in bioenergy ecosystems: 1. Model development, validation and sensitivity analysis. *Global Change Biology Bioenergy*, doi: 10.1111/gcbb.12107.
- **Zhu, X.**, Q. Zhuang, Z. Qin, M. Glagolev, and L. Song (2013). Estimating wetland methane emissions from the Northern High Latitudes from 1990 to 2009 using artificial neural networks. *Global Biogeochemical Cycles*, 27(2), 592-604, doi: 10.1002/gbc.20052.
- Song, L., J. Fan, W. Harris, S. Wu, H. Zhong, Y. Zhou, N. Wang, and **X. Zhu** (2012). Adaptive characteristics of grassland community structure and leaf traits along an altitudinal gradient on a subtropical mountain in Chongqing, China. *Plant Ecology*, 213(1), 89-101, doi: 10.1007/s11258-011-0009-x.
- **Zhu, X.**, Q. Zhuang, M. Chen, A. Sirin, J. Melillo, D. Kicklighter, A. Sokolov, and L. Song (2011). Rising methane emissions in response to climate change in Northern Eurasia during the 21st century. *Environmental Research Letters*, 6(4), doi: 10.1088/1748-9326/6/4/045211. (Media coverage)
- Qin, Z., Q. Zhuang, **X. Zhu**, X. Cai, and X. Zhang (2011). Carbon consequences and agricultural implications of growing biofuel crops on marginal agricultural lands in China. *Environmental Science & Technology*, 45(24), 10765–10772, doi: 10.1021/es2024934.
- **Zhu, X.**, H. He, M. Liu, G. Yu, X. Sun, and Y. Gao (2010). Spatio-temporal variation of photosynthetically active radiation in China in recent 50 years. *Journal of Geographical Sciences*, 20(6), 803-817, doi: 10.1007/s11442-010-0812-7.
- Liu, M., H. He, G. Yu, X. Sun, **X. Zhu**, L. Zhang, X. Zhao, H. Wang, P. Shi and S. Han (2010). Impacts of uncertainty in data processing on estimation of CO₂ flux components. *Chinese Journal of Applied Ecology*, 21(9), 2389-2396. (In Chinese with English abstract)
- Shi, R., **X. Zhu**, H. Zhang (2008). Spatialization of station measured net ecosystem exchange using artificial neural network. *Proceedings of 2008 International Conference on Machine Learning and Cybernetics*, 3, 1430-1433, doi: 10.1109/ICMLC.2008.4620630.
- Sun, Y., C. Bi, Z. Chen, **X. Zhu**, W. Zhu, Y. Xu (2007). Current situation of water quality and pollution assessment of Taopu River in Shanghai. *Urban Environment & Urban Ecology*, 20(3). (In Chinese with English abstract)

Presentations

- Parmentier, F. J. W., W. Zhang, Y. Mi, **X. Zhu**, P. A. Miller, J. van Huissteden, D. Hayes, Q. Zhuang, A. D. McGuire and T. R. Christensen. Higher Methane Emissions in Regions of Sea Ice Retreat. 2014 AGU Fall Meeting, San Francisco, CA, USA
- Bohn, T., J. Melton, V. Brovkin, G. Chen, S. N. Denisov, A. V. Eliseev, A. Gallego-Sala, M. Glagolev, A. Ito, J. O. Kaplan, T. Kleinen, S. Maksyutov, K. C. McDonald, M. Rawlins, W. J. Riley, R. Schroeder, R. Spahni, B. Stocker, Z. M. Subin, H. Tian, B. Zhang, **X. Zhu** and Q. Zhuang. Intercomparison of the Wetchimp-Wsl Wetland Methane Models over West Siberia: How Well Can We Simulate High-Latitude Wetland Methane Emissions? 2014 AGU Fall Meeting, San Francisco, CA, USA
- **Zhu, X.**, J. Tang, M. Wallenstein and W. Riley. Simulate an isotope-labeled substrate addition experiment using a microbe-explicit soil decomposition model. 2014 AGU Fall Meeting, San Francisco, CA, USA

- **Zhu, X.** and Q. Zhuang. Can Methane Sources Counterbalance the Carbon Dioxide Sink in the Pan-Arctic? EAPS Department Colloquium, Apr. 15, 2014, West Lafayette, IN, USA
- Parmentier, F. J. W., W. Zhang, Y. Mi, **X. Zhu**, P. A. Miller, K. van Huissteden, D. Hayes, Q. Zhuang, A. D. McGuire and T. R. Christensen. Higher Methane Emissions in Regions of Sea Ice Retreat, EGU General Assembly, Apr. 27-May 02, 2014, Vienna, Austria
- **Zhu, X.** and Q. Zhuang. Modeling pan-Arctic GHG fluxes in natural terrestrial ecosystems. Feb. 20, 2013, West Lafayette, IN, USA
- Zhuang, Q., **X. Zhu**, C. Prigent, J. Melillo, A. McGuire, R. Prinn and D. Kicklighter. Influence of Changes in Wetland Inundation Extent on Net Fluxes of Carbon Dioxide and Methane in Northern High Latitudes from 1993 to 2004. AGU Annual Conference, Dec. 2-8, 2012, San Francisco, CA, USA
- **Zhu, X.**, Q. Zhuang, Z. Qin, L. Song and M. Glagolev. Estimating Wetland Methane Emissions in Northern High Latitudes Utilizing Artificial Neural Networks from 1990 to 2009. NASA Land-Cover and Land-Use Change Science Team Meeting, Apr. 3-5, 2012, Rockville, MD, USA
- Qin, Z., Q. Zhuang, **X. Zhu**. Making bioenergy from marginal agricultural lands: carbon consequences and agricultural implications in China. China-US 2011 joint symposium, global sustainability issues in energy, climate, water and environment, Sep. 25-28, 2011, West Lafayette, IN, USA
- **Zhu, X.**, Q. Zhuang, H. He. Modeling maximum light use efficiency and plant gross primary production using MODIS and AmeriFLUX data. Purdue OIGP Spring Reception, Apr. 20, 2011, West Lafayette, IN, USA

Honors and Awards

2011 - 2014	Research Assistant Scholarship
2010	Ross Graduate Fellowship
2007	Outstanding Graduate of East China Normal University
2005	National Scholarship
2003 - 2007	Departmental scholarships for excellent students of the year

Professional Services

Membership

American Geophysical Union (AGU), European Geosciences Union (EGU)

Referee

Biogeosciences, Environmental Research Letters, Journal of Mountain Science, Ecological Modelling, Journal of Geophysical Research

Teaching Experiences

Principles of Terrestrial Ecosystem Ecology, Fall 2013, at Purdue University (Guest Lecturer)